DEPARTMENT OF DEFENSE

DEFENSE INFORMATION SYSTEMS AGENCY

UNITED STATES OF AMERICA

TACTICAL INTEGRATION PLAN

Version 1.0
Template (Progress Report)
16 November 1993

Introduction.

The Tactical Integration Plan (TIP) completes the migration process. It is designed to highlight specific corrective actions, that maybe required in order to qualify the winner of the migration assessment process as a full fledged candidate for migration. Focus is on designating the party or parties responsible for taking the necessary corrective action, the amount of resources that will be consumed to accomplish this action, and the expected length of time to accomplish the task.

This report constitutes a TIP Automation Version 1.0 in progress review.

Scope.

Version 1.0 of the TIP makes use of expert system techniques. The expert system reasons about the answers chosen during the assessment phase. It takes particular note of answers that reflect less than full functionality. This reasoning is in the form of questions whose answers lead to suggested actions necessary to correct perceived deficiencies. To understand where the TIP fits in the overall Technical Planning for Migration scheme, we must make reference to Figure 1. One can see that the TIP is the end of the process.

<GRAPHIC: TACT1.PCX>
(Graphic files were not included on the original disk.)

Figure 1

The input to the expert system draws upon all upstream processing, as shown in Figure 2. In Figure 2, we also see the inference engine, which is the heart of the Expert System, being fed by a rule base - another name for the questions referred to earlier.

<GRAPHIC: TACT2.PCX>

Figure 2

In order to better understand Version 1.0 refer to Figure 3 which shows a framework for putting this version in context. The cross hatched oval is intended to show that this effort is a trade off between automation and a detailed implementation plan. The insert depicts a notional learning curve for expert system automation. It indicates that the methodology has considerable growth potential.

overview

Having introduced the method, we will now consider the content of the TIP. Generating the content is the major challenge of expert system based automation. The Tactical Integration Plan (TIP) is the third decision support document (following the migration assessment report and the Integration Decision Paper) that is prepared to support a legacy application migration effort. The TIP is intended to serve three major purposes.

First, it is intended to provide a roadmap for the actual process of integrating legacy applications into a single designated migration system. As such, it must address all three components of an automated information system (AIS): application, data, and infrastructure. The expert system shell reasons about the interactions of applications, data, and infrastructure with the four subject areas of functional, programmatic, data handling, and technical. Figure 4 shows this conceptually. The box on the left hand side of the figure anticipates some of the major categories of concern within the TIP.

Second, the TIP is intended to demonstrate the technical as well as practical feasibility of the planned migration effort. It should demonstrate not only that legacy application customers can be successfully moved onto the designated migration system, but that migration effort can be accomplished in a timely and cost-effective manner.

Third, the TIP is intended to address the important issue of cross-functional integration by ensuring that cross-functional requirements are fully addressed during the migration effort

The intended audience for the TIP consists of OSD Principal Staff Assistants (PSA's), the Functional Activity Program Manager (FAPM), the Cross-Integration Assessment Council, and the various organizations (e.g., DITSO, DINSO,etc.) responsible for the subsequent execution of the plan. The TIP is prepared under the direction of the relevant functional area Technical Integration Manager (TIM) of the Center for Integration and Interoperability (CFI&I) .

It is envisaged that a TIP will be prepared for each functional activity (or Subactivity) for which a migration effort is required (within a functional area) . Accordingly, each TIP actually consists of several detailed technical plans. There will be a technical plan for the migration application itself, describing the technical and/or functional modifications needed for

<GRAPHIC: TACT3.PCX>

Figure 3

it to support the legacy system community. The TIP must also provide a detailed technical plan for each legacy application being migrated to the designated migration application. The TIP must describe any new technology insertion, reengineering, or other modernization efforts that are planned as part of (and to be carried on concurrently with) the overall migration project Particular attention should be drawn to aspects of the integration plan that address any deficiencies of the designated migration system uncovered during the migration assessment effort.

Since a single TIP will address the integration plans of each legacy systems that is being migrated to (integrated with) the designated migration system, it itself will be an integrating vehicle, ensuring the integration of all technical plans for the migration effort.

Content Details

We can summarize the content section as follows. As we have

<GRAPHIC: TACT4.PCX>

Figure 4

said previously, the migration application is examined for deficiencies. A response in the form of a remedial action will be suggested. Each of the areas considered, and there are up to ten in all, will generate a schedule. (Note that the skill level and the tool are not included in Version 1.0. Also understand that "schedule" can also refer to the time to perform or duration of the task. Otherwise it refers to a tabular array in the sense of a "tax schedule".) In Annex 1 we have a table which collects and displays most foreseeable tasks regardless of Version. The display at Annex 1 adds an additional column highlighting the deficiency being addressed.

We now introduce each of the major topic headings with short paragraphs on each. Note that the topic heading go well beyond consideration of the three basic AIS elements of applications, infrastructure, and data. Version 1 will add security, training, and cross functional integration. It most likely will not address project management and related areas.

There are three major tasks that are typically required in an AIS integration project: (1) application integration, (2) data integration, and (3) infrastructure integration. Application integration refers to the process of ensuring that all functional requirements of the given business activity are met by the application software designated as the integration (or migration) application. Data integration refers to the process of converting, as necessary, data from legacy applications to the migration application. Infrastructure integration refers to the process of ensuring that the hardware, systems software, an communications requirements of the integration application are satisfied.

The complexity of specific AIS integration efforts will differ greatly from one integration project to another. An integration effort may be a simple as authorizing as new users the customers of ail the legacy applications being replaced by the migration application. Alternatively, it may entail a significant development effort to enhance the selected migration application to be able to provide the processing capabilities of all existing legacy applications supporting a given functional activity. The basic strategy for the integration effort should have been developed and documented in the Integration Decision Paper(IDP) That basic strategy is elaborated upon in the TIP.

To recapitulate each major area of concern generates a schedule listing various areas requiring remedial action. A typical schedule has column entries for who will perform the action, how much they will spend and finally how long the task is expected to take. We now elaborate on the first three categories previously introduced.

Applications Migration

The first major section concerns applications. The TIP contains an appropriately detailed description of the development process to be used to migrate all legacy application processing to

the designated integration application. Analysts will determined the nature and extent of the functional process integration effort required and develop a plan for modifying the integration application to meet the functional requirements of legacy application users. Concurrent with this analysis, integration planners will determine the data conversion needs associated with the planned integration. At the same time, analysts must determine infrastructure requirements and define the changes needed in the hardware, systems software. and communications environment to ensure that the integration application will be able to support all current legacy application customers.

Data Migration

Data is the second major section. We expect that a separate data integration activity will be required for each legacy system being migrated. Additional specificity is required in this area.

Infrastructure Migration

A third major section concerns infrastructure. It will begin by describing the strategy to be employed. There are several generic infrastructure strategies available,including replication, non-integrated consolidation, and full-functional integration. The replication strategy refers to the use of a common migration application software at all current legacy application processing sites. Legacy applications are moved to the designated migration application, but all application processing remains at the existing processing sites.

Non-integrated consolidation refers to the integration strategy of consolidating legacy application processing on a common designated migration system at a common processing site, but with no further functional integration. This means that only one application program has to be maintained and a single processing facility can be shared by each (logically decentralized) application.

Finally, full-functional integration refers to the migration of legacy applications to a single, logically integrated application, running in either a physically centralized or node. Full-functional infrastructure integration is a target integration strategy that may not be practical during the early phases of integration within a functional activity.

The general strategy for infrastructure integration will have been identified in the IDP. The TIP must result in a detailed set of infrastructure requirements that that general strategy entails. For example, if the strategy is to replicate the migration application among all current legacy application processing sites, it will be necessary to ensure that each current processing site can support the new migration application in terms of processing capacity, mass storage, systems software, and communications. If the proposed strategy, on the other hand, is to consolidate legacy applications at a single site, the increased workload for that site must be calculated and hardware, systems software, and

communications upgrade requirements must be defined.

If a replication strategy is adopted, the TIP must address infrastructure integration requirements for each legacy system. The TIP only needs to examine infrastructure issues of the migration application to the extent that the migration application is to be significantly modified to meet the functional requirements of the legacy applications.

If a non-integrated consolidation strategy is adopted, workload and communications requirements for each legacy application must be determined. These requirements must be met by the migration system processing site.

This section should also address plans for disposing of equipment or other infrastructure capabilities that the migration effort will render surplus.

Security Migration

This section addresses all security requirements of the integration effort. Security issues are cross-cutting and will arise in each major area of the integration effort: application, data, and infrastructure. The purpose of this separate section is to elevate awareness of the importance of security issues surrounding legacy system migration and to consolidate all security requirements into a single, integrated task.

Training Migration

This section addresses training requirements of the integration effort. It should address the training required for legacy system users, operators, and software maintenance personnel as they move into the migration system environment

Cross-Functional Technical Integration Migration Cross-functional technical integration refers to the process of integrating application software, data, and infrastructure capabilities either within a functional area (i.e.,: among functional activities) or across functional areas. Legacy system migration planners should endeavor to identify opportunities for (technical) cross-functional integration during migration planning and develop short-term plans for achieving cross-functional integration during the actual legacy system integration effort. This section of the TIP should identify all opportunities identified for cross-functional integration. This section of the TIP should also describe the short-terms plans for each cross-functional integration effort that is deemed feasible within the time constraints of the overall migration effort. it is recognized that technical integration is an iterative process and that many technical integration tasks will have to be deferred to after the initial legacy system integration project

Mechanics and a Sample Schedule.

When completed each of the areas described under the

preceeding section, generates a table or schedule. An example is shown in Figure 5 which depicts the table as it looks to the computer, i.e. with instructions on what to fill in. In order to understand Figure 5, which shows sample table entries for application and infrastructure categories respectfully, we must examine rule construction. Before doing so we note that some entries will come directly from the user on line as for instance cost and timing/priority entries. Other entries such as the "who" will most likely feature partial automation in the guise of table selections constructed on the fly. Now to the rules.

Two examples are selected for purposes of demonstration: one simple, and the other complex. Each begins with answers to assessment questions (IF clauses) and ends with recommendations (THEN clauses) for corrective action(s). The sources of the rules also differs. The first is based on a negative answer to a assessment question with a straightforward remedy. The second starts from a negative answer but concatenates "IF clauses" and ends with recommendation drawn from industry/government practices.

Simple Rule:	**IF** the primary programming language of the application is not Ada **THEN** (consider) re-writing the migration application in Ada before migrating the legacy application community to the migration

<GRAPHIC: TAC5A.PCX

Figure 5a

<GRAPHIC: TAC5B.PCX>

Figure 5b

application.

Complex Rule: **IF** the designated migration application is not based on a client server design
AND the migration application does not have strigent performance requirements
AND the migration application is not intended for enterprise use
AND the migration application does not require other distributed computing services **THEN** (consider) a technical reengineering of the migration application to enable the distribution of presentation, business, and data management logic functions among client server processes.

Each begins with answers to assessment questions and ends with a recommended corrective action. The whole process is depicted in Figure 6, which shows a final notional template.

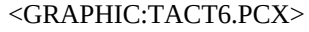

Figure 6

ANNEX 1
CONSOLIDATED TEMPLATE LISTING (TO DATE)

<GRAPHIC: TACT7.PCX>

<GRAPHIC: TACT8.PCX>

ANNEX 2
CONSOLIDATED QUESTION LIST (TO DATE)

Preliminary TIP GENERATION RULES
11/2/93

DATA

Functional Questions

A. Data Sharing

2. IF the data elements used by the designated migration application were not developed in accordance with DoD 8320.1-M-1 (Data Element Standardization Procedures)

   THEN (consider) re-engineering the data elements of the designated migration system before legacy system consolidation.

   IF the data elements used by the designated migration application were not developed in accordance with DoD 8320. 1-M-1 (Data Element Standardization Procedures)

   AND the data elements of a rejected legacy were developed in accordance with DoD 8320.1-M-1

   THEN (consider) re-engineering the data elements of the designated migration system in terms of the data elements standards of the rejected legacy application.

4. IF the data elements of the designated migration application are not maintained in a data dictionary.

   THEN (consider) the acquisition of a COTS-based data dictionary product to maintain the data elements of the migration application.

   IF the data elements of the designated migration application are not maintained in a data dictionary.

   AND the data elements of a rejected legacy application are maintained in the COTS-based data dictionary product

   THEN (consider) adaptation of that legacy application data dictionary product for use with the designated migration system.

B. Data Quality

II. Technical Questions

A. Data Integrity

B. Data Services

C. Data Dictionary

D. Daft Update

III. Data Handling Questions

A. Data Recovery

[IV. Programmatic Questions]

APPLICATION

I. Functional Questions

A. Operational Status

B. Cross-Functional Support

1. IF any legacy application data that is a by automated systems of other functional areas or activities
AND the designated migration application does not generate this same data
THEN modify the migration application to ensure that this cross-functional integration requirement is met.

2. IF any legacy application uses data generated by applications in other functional areas or activities
AND it is determined that this data meets a functional requirement that designated migration application must satisfy.
AND the designated migration application does not currently access this data as generated by applications within other functional areas or activities THEN modify the migration application to ensure that this cross-functional integration requirement is met.

C. Functional Activity Operational Requirements

1. IF there are a ny security requirements that are unique to this Functional Activity and are not being met by the designated migration system.
AND these security requirements are being met by a given legacy system
THEN modify the migration system to ensure that these security requirement will be met for the legacy system community that them

IF there are any technical requirements that are unique to this Functional Activity and are not being met by the designated migration system
AND these technical requirements are being met by a given legacy system
THEN modify the migration system to ensure that these technical requirements will be met for the legacy system community that requires them.

IF there are any functional requirements that are unique to this Functional Activity and are not being met by the designated migration system
AND these functional requirements are being met by a given legacy system modify
THEN modify the migration system to ensure that these functional requirement will be met for the legacy system community that requires them.

D. Usability

II. Technical Questions

A. Technical Base

6. IF the primary programming language of the designated migration application is not Ada
THEN (consider) re-writing the migration application in Ads before migrating the legacy application community to the migration application.

7. IF the designated migration application is not based on a client-server design
AND the migration application does not have stringent performance requirements
AND the migration application is not intended for enterprise-wide use

AND the migration application does not require other distributed computing services
THEN (consider) a technical reengineering of the migration application to enable the distribution of presentation, business, and data management logic functions among client and processes.

8. IF the operating system on the primary or most common platform where the designated migration application is to be hosted is not POSIX UNIX
AND the migration application can (or can be easily converted to) run under POSIX UNIX
THEN (consider) the economic feasibility of acquiring POSIX UNIX compliant hardware platforms and the conversion of the migration application to POSIX UNIX as part of the Tactical Integration Plan.

B. Security

1. IF a legacy application provides support for the control of sensitive data
THEN ensure that the designated migration system can provide support for the control of similar sensitive data

2. IF a legacy application is currently hosted in a multi-level secure, system high periods processing, or dedicated system environment
THEN ensure that the designated migration system will only be hosted on a multi-level secure, system high, periods processing, or dedicated system environment

C. Maintenance & Reliability

III. Data Handling Questions

A. Data Manipulation Tools

1. IF the dominant data environment for the designated migration application is not relational database management system
THEN (consider) the incorporation of a COTS-based relational data management system into the designated migration system during legacy system consolidation.

2. IF the data retrieval environment for the designated migration system is not SQL or an extension of SQL
THEN (consider) the adoption of a COTS-based SQL product to provide data retrieval capabilities for the migration system environment.

3. IF the designated migration application uses a non-commercial passive data dictionary
THEN (consider) the acquisition of a COTS-based passive data dictionary to support the migration system environment

IF the designated migration application uses a non-commercial active data dictionary
THEN (consider) the acquisition of a COTS-based active data dictionary to support the migration system environment.

B. Data Access

l.b. IF a legacy application user must obtain information from another application for subsequent processing in the legacy application
AND the requirement that this information supports is mandatory for this functional activity
THEN ensure that the designated migration system can meet this mandatory functional requirement
AND (consider) developing an automated Intelligence between the migration application and the other application from which the legacy application user obtains the required information.

1.c. IF a legacy application user initiates or records an action using the legacy application based on information obtained from another application or other external data source
AND these actions support a mandatory requirement of this functional activity
THEN (consider) adding business processing logic to the migration application to automate this decision process
AND (consider) developing an automated interface between the migration application and the other application(s) and data sources from which the legacy application user obtains the required information

C. Data Input

1. IF data is sometimes required to be entered into the designated migration application more then once
THEN modify the migration application to ensure that data does not have to be more than one.
2. IF newly entered data is not validated prior to updating any associated database in the designated migration application
THEN modify the migration application to ensure that all data is properly validated prior to updating any associated database.

IV. Programmatic Questions

A. Life Cycle Issues

l.c. IF no LCMP exists for the designated migration application
THEN develop a LCMP in accordance with DoD 8120 and 7920) series documents.

l.b. IF a LCMP for the designated migration application but follows a service regulation (as opposed to DoD 8120 and 7920)
THEN (consider) modifying the LCMP so that it reflects the prescriptions of DoD 8120 and 7920 series documents.

B. Contractual Issues
C. Documentation

INFRASTRUCTURE
I. Functional Questions

A. Design Considerations

2.d. IF the infrastructure supporting the designated migration application does not support the Functional Activity or Area mission
5 AND the infrastructure supporting a legacy application that was rejected as the migration system does support the Functional Activity or Area mission
AND this infrastructure is compatible with the designated migration system (in the sense that the designated migration system could be ported to the this infrastructure with relatives ease)
THEN (consider) porting the designated system to the infrastructure of the legacy application that supports the Functional Activity or Area mission.

2.b&c. IF the infrastructure supporting the designated migration application provides support for the current mission but still requires support from outside capabilities
THEN (consider) upgrading the infrastructure of the migration system before legacy system consolidation to enable the infrastructure to fully support the Functional Activity or Area mission.

B. Processing Model

C. Usability

1.b. IF the training capabilities of the designated migration system are limited to system independent capabilities (e.g., classroom instruction or an automated training module)
THEN consider the feasibility of developing integrated training capabilities (e.g., on-line, interactive tutorials) for the designated migration system.

l.b. IF the training capabilities of the designated migration are limited to system independent capabilities (e.g., classroom instruction or an automated training module)
AND the development of integrated training capabilities (e.g., on-line, interactive tutorials) for the designated migration system is not feasible during the legacy consolidation process
THEN ensure that additional time is allocated in the migration schedule for training of legacy system users on the migration system.

2. IF the user interface for the designated migration application is not completely consistent across all platforms upon which the migration application runs
THEN (consider) reengineering the user interface to ensure complete consistency across all platforms upon which the migration application and migration legacy application users will run.

D. TAFIM Services

II. Technical Assessment

A. Network Services
B. Security Service
C. Management Services
D. Communications Services

E. DISN Status

I.b. IF the designated migration system is DISN compatible but not currently connected to DISN

AND there are external communications requirements of other systems in the legacy system portfolio
THEN connect the migration system to DISN to meet connectivity requirements of these other systems.

1.c. IF the designated migration application uscs proprietary communications capabilities that make it incapable of being connected to DISN
AND there external communications requirements of other systems in the legacy system portfolio
THEN determine the feasibility of replacing the proprietary communications capabilities of the designated migration system with DISN-compatible capabilities.

F. Reliability

III. Data Handling Questions

IV. Programmatic Questions

A. Contractual Issues

2.c. IF the current contracts for designated migration system do not have any provisions for technology upgrades
AND the Tactical Implementation Plan requires the acquisition of information technology
THEN ensure that these acquisition contracts contain appropriate provisions for technology refreshment or pre-planned product improvements (P3I).

2.b. IF the current contracts for the designated migration systems has only provisions for technology refreshment
AND the current contract for the designated migration does not have pre-planned product improvement (P31) provisions
AND the Tactical Implementation Plan requires the acquisition of information technology
THEN ensure that these acquisition contracts contain appropriate provisions for pre-planned product improvements (P31).